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A new species of the *calamarina* group of the colubrid snake genus *Tantilla* (Reptilia: Squamata) from Guerrero, Mexico, with a review of and key to members of the group

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Abstract.—A new species of *Tantilla* of the *calamarina* group, *T. sertula,* is described from the Pacific coastal plain of southwestern Guerrero, Mexico. It belongs to a clade that contains *T. calamarina, T. cascadae, T. coronadoi, T. deppei,* and *T. vermiformis.* All these species are endemic to Mexico, except for *T. vermiformis,* which is distributed along the Pacific coastal plain from El Salvador to northwestern Costa Rica. The new species appears to be the sister species of *T. cascadae.* Members of the *calamarina* group are highly adapted to fossoriality.

Mexico is the center of diversity for the speciose genus *Tantilla* (Wilson 1999), which, exclusive of the species described herein, contained 53 species (Wilson 1999). Twenty-seven of these 53 species were noted by Wilson (1999) to occur in Mexico. The majority of our knowledge of the diversity of Mexican *Tantilla* has accrued since 1942, when the last country-wide survey was undertaken by Smith (1942), who listed 19 species, 12 of which are currently considered valid (Wilson 1999). Since Smith's work, 10 valid species have been described from Mexico, and an additional five species have been added to the herpetofauna of that country—either species known previously from elsewhere or taxa elevated to species level.

The *calamarina* group of *Tantilla* is an important assemblage of species in the Mexican segment of the genus. The *calamarina* group was recognized and reviewed by Wilson & Meyer (1981). They included four species in the group, one of which (*T. cascadae*) was described by them. The other three species they included are *T. calamarina, T. coronadoi,* and *T. deppei.* Wilson et al. (1999) tentatively associated another species, *T. vermiformis,* known from Pacific coastal localities in El Salvador, Nicaragua, and Costa Rica (Wilson 1982, Dueñas et al. 2000), with the *calamarina* group. The four species treated by Wilson & Meyer (1981) are all endemic to Mexico, and occur collectively at elevations from sea level to 2438 m in the western portion of the country from northern Sinaloa to central Guerrero, Morelos, and México, including the Tres Marías Islands. With the addition of *T. vermiformis* to the *calamarina* group, the distribution of the group extends along Pacific coastal regions from Sinaloa to northwestern Costa Rica.

Although one would expect that other species of *Tantilla* await discovery in the mountainous regions of the southern portion of the country, given that the most recently discovered species are distributed there, it is of interest, therefore, that the next new species to be discovered is from the southern region of Mexico, but not from its mountainous areas. While working on a review of the species of *Tantilla* from Mexico, the senior author contacted the junior author, who informed him of the existence of a single juvenile specimen of *Tantilla* from Pacific coastal Guerrero that did not fit the description of any of the known species of the *calamarina* group. Examination of this specimen by the senior author confirmed the junior author's suspicions and below we provide a description of this new taxon, which is named:

Tantilla sertula, new species

Fig. 1

Holotype.—The University of Texas at Arlington (UTA) R-38145, a juvenile female from 0.8 km NNE of the junction of Mexico highway 200 on the road to La Unión (17°59′N, 101°49′W), Guerrero, México, approximate elevation slightly above 150 m, collected in July 1978, by J. A. Campbell.

Diagnosis.—A member of the *Tantilla calamarina* group with 7 supralabials; 161 ventrals; 30 subcaudals; two postoculars; 1+1 temporals, contacting one another; a dark middorsal stripe occupying the middle of the middorsal scale row; no dark lateral stripe; a head pattern consisting of a spatulate dark anterior extension of the middorsal dark stripe occupying the dorsum of the head, flanked by pale narrow, longitudinal stripes broadly separated from pale postparietal spots; and uniformly dark brown supralabials.

Description of the holotype.—A juvenile female with 15 smooth dorsal scales throughout the trunk, 161 ventrals, a divided cloacal scute (= anal plate), 30 subcaudals, a total length of 99 mm, a tail length of 12 mm, and a tail/total length ratio of 0.121.

Nasal completely divided, posterior section in contact with single preocular on both sides of head; two postoculars, about subequal in size; one anterior and one posterior temporal, in contact with one another, anterior temporal separating parietal and fifth supralabial, posterior temporal elongate, slightly smaller than anterior scale; supralabials 7–7, first in contact with rostral, prenasal, and postnasal, second with postnasal and preocular, third with preocular and orbit, four with orbit and lower postocular, fifth with lower postocular and anterior temporal, sixth with anterior temporal, and seventh with anterior and posterior temporals, seventh largest; infralabials 6–6, first four in contact with the anterior chinshields, fifth in contact with anterior and posterior chinshields, 4th largest, first pair broadly separated by contact of mental and anterior chinshields; anterior chinshields larger than posterior pair.

The dorsal ground color in preservative is pale brown, each scale of which has, upon microscopic examination, an irregular concentration of dark pigment along its median portion. A narrow, irregular dark brown middorsal stripe extends down the middle of the middorsal scale row. This stripe expands anteriorly to cover the entire middorsal row and adjacent halves of the paravertebral rows about three dorsal scales posterior to the parietal notch, just before joining the dark head cap. The middorsal row is complete anteriorly, becoming increasingly disjunct posteriorly.

The dorsum of the head is very dark brown, appearing as a dark head cap in the vague shape of a blunt arrowhead. This configuration is created by a pale border that begins on the dorsal apex of the rostral and continues, in gradually diminishing width and intensity, across the anterodorsal corner of the anterior nasal, the middle of the internasal, the canthal region of the prefrontal, the orbital edge of the suprocular, and the dorsal corner of the upper postocular. Beyond this point, this border becomes very narrow and broken until it reaches a point on the lateral edge of the parietal opposite the suture between the anterior and posterior temporal, where it expands into a tear drop-shaped spot. This pale border is separated from a postparietal pale spot, occupying portions of three dorsal scales immediately posterior to the posterolateral portion of the parietal. The post-

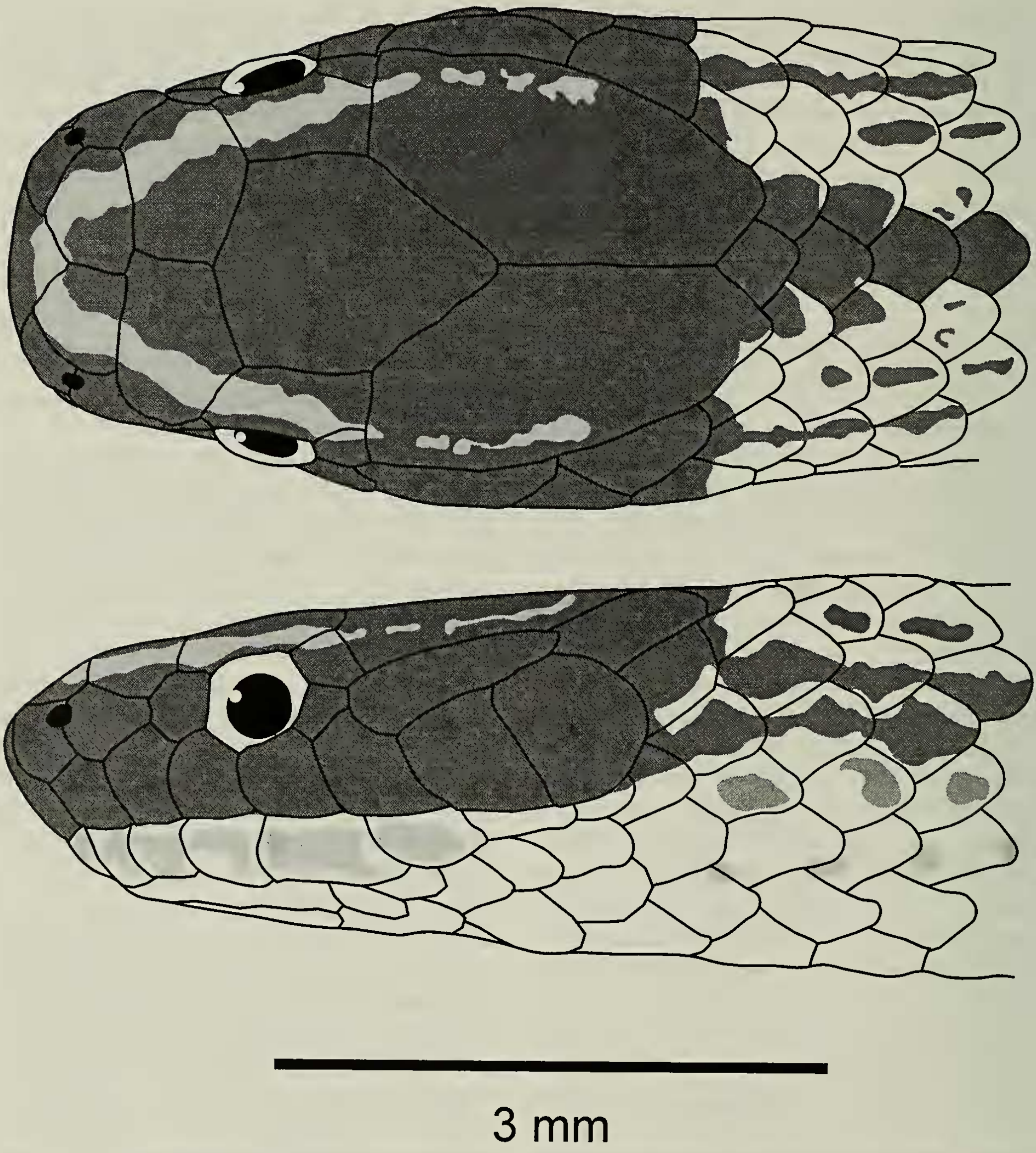

Fig. 1. Semidiagrammatic representation of dorsal and lateral head scutellation of the holotype (UTA R-38145) of *Tantilla sertula.*

parietal pale spots grade posteriorly into the dorsal ground color. The lateral portion of the head below the pale dorsal border is uniformly dark brown. The chin is cream, with vague smudging along the lingual edge of the infralabials. The venter is immaculate cream.

Distribution.—Known only from the type-locality, near the village of La Unión, located along the Río La Unión, a few kilometers on an unpaved road from the junction of this road with Mexico highway 200. The type locality is 0.8 km NNE of this junction in the direction of La Unión, and lies on the Pacific coastal plain of southwestern Guerrero. This area is seasonally dry and is covered with bosque tropical caducifolio (Rzedowski 1988) or tropical deciduous forest (Leopold 1972). This forest type is comparable to the Lowland Deciduous Forest bioclimate (Savage 1975) or the Lowland Dry forest formation (Holdridge 1967).

Etymology.—The name *sertula* is from the Latin meaning a "small garland or wreath," in allusion to the distinctive pattern on the dorsum of the head.

Discussion

Wilson & Meyer (1981) established the case for the recognition of a *calamarina* group within the genus *Tantilla,* distinct from the *melanocephala* group as recognized by Wilson & Mena (1980). Both of these groups are characterized, in part, by possession of a middorsal dark stripe (although this pattern element is lost in some populations of *T. capistrata* and *T. melanocephala*). The principal evidence used by Wilson & Meyer (1981) to support recognition of the *calamarina* group is similarity of head pattern. The four species included by them all lack a dark nape band, a feature distinguishing them from almost all members of the *melanocephala* group. Wilson & Meyer (1981: 2) further noted that all members of the group "have the central portion of the parietals covered with a spatulate anterior extension of the middorsal dark stripe, which continues anteriorly to cover the remainder of the [central portion] of the head. On either side of this central mark is a postparietal pale spot [except *T. deppei*; see below] that usually grades posteriorly into the ground color of the dorsolateral field (area between the lateral and median dark stripes) and, in its best-developed state, connects anteriorly with a narrow extension that proceeds along the side of the parietal, over the supraocular and onto the side[s] of the prefrontals and internasals." They (1981: 2–3) further noted that "*Tantilla deppei* has this same narrow pale marking around the rim of the dorsum of the head but it may or may not connect to a middorsally divided pale collar (the fact that [such a] pale nuchal marking appears more like a broken collar than a pair of nuchal or postparietal spots is due, perhaps, to the narrowness of the connection between the middorsal stripe and the dark pigment on top of the head)." Finally, They pointed out that, "The supralabials of all these forms are generally pale in color, with some dark pigment along their upper borders." This dark pigment represents the lower edge of the dark mask present below the pale rim of the dorsum of the head.

In discussing the relationships of *T. brevicauda* to members of the *taeniata* group of *Tantilla,* Wilson et al. (1999) indicated that *T. vermiformis* "is characterized by the presence of a 'thin disjunct dark middorsal stripe confined to the middorsal scale row' (Wilson 1982), among other features. Given this feature, as well as the small size, relatively low numbers of ventrals and subcaudals, occasional fusion of the primary temporal and the sixth supralabial, pale head markings on the parietal, and the recently-demonstrated presence in El Salvador (Dueñas et al. 2000), it might appear more logical to associate *T. vermiformis* with the members of the *T. calamarina* group (Wilson & Meyer 1981)."

Whereas the view of Wilson et al. (1999) is defensible, it should be noted that the information they provided does not tell the entire story. As is obvious, the genus *Tantilla* consists of a large number of fossorial to semifossorial species. They are all generally small, as is typical of such snakes, although several species can reach total lengths in excess of 600 mm (Wilson 1982, Campbell et al. 1995, Campbell 1998). *Tantilla vermiformis,* as well as the four recognized members of the *calamarina* group and *T. sertula,* are among the smallest members of the genus. The maximum known total lengths (in mm) of four of these species are as follows: *T. vermiformis*—157; *T. coronadoi*—183; *T. calamarina*—202; *T. deppei*—273. The holotype of

Table 1.—Comparison of selected characters among members of the *Tantilla calamarina* group.

Features	*T. sertula*	*T. calamarina*	*T. cascadae*	*T. coronadoi*	*T. deppei*	*T. vermiformis*
Ventrals in males	—	106–133 (119.7)	—	158	142–151 (145.9)	115–123 (119.6)
Ventrals in females	161	118–140 (129.0)	139	165	153–168 (160.1)	120–129 (124.2)
Subcaudals in males	—	30–43 (36.8)	—	35+(?)	54–62 (57.2)	23–28 (25.3)
Subcaudals in females	30	22–43 (28.8)	37	40	43–50 (46.2)	19–24 (21.0)
Ventrals + subcaudals in males	—	145–166 (156.9)	—	—	196–213 (203.1)	141–147 (144.5)
Ventrals + subcaudals in females	191	146–179 (158.0)	176	205	196–214 (206.3)	140–150 (144.7)
Preocular	Present, in contact with postnasal	Tendency toward decrease in size to complete loss	Present, in contact with postnasal	Present, in contact with postnasal	Present, in contact with postnasal	Present, in contact with postnasal, sometimes fused with prefrontal
Number of postoculars	2	1	2	2	2	2
Number of supralabials	7	Usually 6	6	7	Usually 7	7
Anterior and posterior temporals separated	No	No	No	Yes	No	No
Fusion of anterior temporal and sixth supralabial	No	No	No	No	No	Occasionally
Head pattern	Spatualate dark anterior extension of middorsal dark stripe flanked by prominent pale narrow longitudinal markings confluent with pale postparietal spots	Spatulate dark anterior extension of middorsal sark stripe flanked by two pale spots	Spatulate·dark anterior extension of middorsal dark stripe flanked by pale narrow longitudinal markings confluent with pale postparietal spots	Spatulate dark anterior extension of middorsal dark stripe flanked by pale anterior extensions of dorsolateral ground color	Spatulate dark anterior extension of middorsal dark stripe flanked by pale anterior extension of middorsally-divided pale nuchal band	Dark brown dorsally and laterally with tan, pale lavender, or pale brown blotches on posterior portion of parietals

Table 1.—Comparison of selected characters among members of the *Tantilla calamarina* group.

Features	*T. sertula*	*T. calamarina*	*T. cascadae*	*T. coronadoi*	*T. deppei*	*T. vermiformis*
Body pattern	Dorsum pale brown on rows 5 to 7, dark brown on rows 1 to 4; dark middorsal stripe on middle of middorsal row	Tan to brown with variously-sized dark middorsal stripe and a dark brown lateral stripe on rows 3 and 4	Pale brown with dark middorsal stripe occupying middle of middorsal scale row; dark lateral stripe on rows 3 and 4 only in neck region	Tan to brown with dark middorsal stripe occupying middle of middorsal scale row and drak lateral stripe on rows 3 and 4	Tan to brown with diffused dark variously-sized middorsal stripe and dark lateral stripe on row 3 or rows 2 and 3; diffuse dark stripe on row 5	Pale brown to brown dorsum with poorly-defined, disjunct dark middoral stripe confined to middorsal row
Ventral pattern	Immaculate cream	Immaculate cream	Cream with slight amount of dark pigment at lateral apices	Immaculate cream	Immaculate cream	Immaculate white, cream, pale yellow, or pale pink

T. cascadae cannot be measured, due to its dessicated condition, and that of *T. sertula* is a juvenile. Thus, insofar as is known, *T. vermiformis* is the smallest of these species (see Table 1).

Tantilla vermiformis possesses a relatively small number of ventrals (Table 1), comparable to those of *T. calamarina.* It also has the lowest number of subcaudals in the *calamarina* group (Table 1). The anterior temporal and the sixth supralabial are occasionally fused (Wilson 1982). *Tantilla calamarina* and *T. cascadae* also show some fusion or loss of head scales (preoculars, postoculars, and supralabials in the former, supralabials in the latter; Table 1 and Wilson & Meyer 1981). Finally, *T. vermiformis* possesses a head pattern incorporating pale parietal spots, reminiscent of the pale postparietal spots of members of the *calamarina* group (Wilson & Meyer 1981, Wilson 1982), although there are no pale, narrow anterior extensions of the pale parietal spots in this species. Also, it does not possess the dark mask and cream lower supralabials of the members of the *calamarina* group; instead, its head is more or less uniformly dark brown dorsally and laterally (Wilson 1982). Nonetheless, the preponderance of evidence points to a status for *T. vermiformis* as a diminutive member of this group of small species of *Tantilla,* the members of which show varying degrees of greater adaptation to a fossorial lifestyle than is typical for *Tantilla.*

Making a case for inclusion of *T. sertula* in the *calamarina* group is much easier than for *T. vermiformis.* It possesses the head pattern typical for the group members, except for the pale lower supralabials, which are lacking in this taxon (at least in this juvenile). On the other hand, its uniformly colored lateral portion of the head is essentially like that of *T. vermiformis,* a resemblance that assists in linking the latter species to others in this group. These head pattern distinctions in the juvenile holotype of *T. sertula,* as well as those of the body, are expected to hold when material of adults is secured, as there is no significant ontogenetic change in color pattern known in the *calamarina* group.

With reference to relationships, Wilson & Meyer (1981: 22) concluded that, "With regard to intragroup relationships, it appears that there are probably three subgroups, one containing *T. deppei,* the least specialized member of the group, a second containing *T. coronadoi,* and a third containing *T. calamarina* and *T. cascadae.*" They went on to say that "*Tantilla deppei* probably will eventually be shown to have some degree of relationship with members of the *melanocephala* group [which has not been established yet]. It differs principally from those snakes in lacking a dark nape band. *Tantilla coronadoi* seems to be more closely related to *T. calamarina* and *T. cascadae* than to *T. deppei,* judged on the basis of similarity of color patterns."

Wilson & Meyer (1981), thus, hypothesized that the *calamarina* group is monophyletic and that its evolution reflects increasing adaptation to a fossorial lifestyle. In addition, they hypothesized that *T. deppei* is the least derived taxon in the group and that *T. calamarina* the most derived. Finally, they suggested that *T. cascadae* is the sister taxon of *T. calamarina* and that *T. coronadoi* is the sister taxon to a clade containing *T. calamarina* and *T. cascadae.*

Given that two additional species (*T. vermiformis* and *T. sertula*) are proposed herein for inclusion in the *calamarina* group, it is a propitious time to present an identification key to this difficult group of snakes.

Revised key to the members of the *Tantilla calamarina* group (based, in part, on Wilson & Meyer 1981, and Wilson 1999)

1. No dark lateral stripe present or, if present, confined to neck region 2
   Dark lateral stripe present on trunk . . . 4
2. Supralabials 6; lower portion of supralabials cream colored . . . . *T. cascadae*
   Supralabials 7; supralabials uniformly dark brown 3
3. Ventrals fewer than 130 (115–129); subcaudals fewer than 30 (19–28) . . . . *T. vermiformis*
   Ventrals 161; subcaudals 30 . . . . *T. sertula*
4. Ventrals 140 or fewer (106–140); postocular single; supralabials 6 . . . . *T. calamarina*
   Ventrals more than 140; postoculars 2; supralabials 7 5
5. Dark lateral stripe on rows 3 and 4; seventh supralabial in contact with parietal, separating anterior temporal from posterior temporal . . . . *T. coronadoi*
   Dark lateral stripe on row 3 only or on rows 2 and 3; seventh supralabial separated from parietal, anterior and posterior temporals in contact with one another . . . . *T. deppei*

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